REMARKS

Claims 1-15 and 21-25 are pending in the application.

Claims 1-15 and 21-25 have been rejected in the Office Action to which the present Reply is responsive. Applicant respectfully traverses these rejections. Based on the present Reply, Applicant respectfully requests reconsideration and withdrawal of the rejections of Applicant's claims, and passage of the present application to allowance and issue.

REJECTIONS OVER HATTORI ET AL. IN VIEW OF MO ET AL. and TSENG

In the Office Action, claims 1-15 and 21-25 were rejected under 35 U.S.C. § 103(a) as obvious over Hattori et al. (U.S. Patent 6,252,294) in view of Mo et al. (U.S. Patent 6,429,481) and Tseng. The Examiner asserted that Hattori teaches various elements of the claimed invention, but admitted that Hattori et al. fails to teach all the features of the claimed invention. The Examiner cited and relied upon Mo et al. in order to remedy some of the admitted deficiencies of Hattori et al., but the Examiner had to resort to Tseng in order to allegedly find all of the features of Applicant's claimed invention. Applicant respectfully traverses the rejections over Hattori et al. in view of Mo et al. and Tseng for the following reasons.

There Can Be No Prima Facie Obviousness, Since the Combined References Fail to Disclose All the Limitations of Applicant's Claims, There is No Showing of Motivation to Combine and Modify the Prior Art, and There is No Reasonable Probability of Success.

The Examiner asserted that Hattori et al. teaches a process similar to that claimed by Applicant, but admitted that Hattori et al. fails to disclose each gettering plug comprising doped fill material containing a plurality of gettering sites and fails to disclose the doped fill material is polysilicon formed by LPCVD deposition of the silicon and the dopant in the cavity, and fails to disclose that the dopant ions are one or more selected from P, As, Sb, Bi, B, Al, Ga, In, He, Ne, Ar, Kr, Xe and Ge, as recited in claims 1-4, 9-12, 21 and 25.

In order to make up for some of the deficiencies of Hattori et al., the Examiner resorted to the newly cited reference Mo et al., asserting that Mo et al. discloses gettering plugs comprising

doped fill material containing a plurality of gettering sites wherein the doped fill material is polysilicon formed by deposition of the polysilicon and the dopant in the cavity and that the dopant is P.

The Examiner then admitted that neither Hattori et al. nor Mo et al. disclosed the doped fill material is polysilicon formed by LPCVD deposition of the polysilicon and the dopant in the cavity.

In order to remedy this deficiency of both the primary and secondary references, the Examiner resorted to the newly cited reference Tseng, asserting that Tseng discloses the doped fill material is polysilicon formed by LPCVD deposition of the polysilicon and the dopant in the cavity, citing col. 5, line 63 to col. 6, line 2 and Fig. 15 of Tseng.

Finally, having assembled the various pieces of prior art in order to allegedly find all of the elements of Applicant's claimed invention, the Examiner simply concluded "It would have been obvious to one of ordinary skill in the art of making semiconductor devices to combine the teaching of Hattori, Mo and Tseng to enable the doped fill material of Hattori to be formed."

This rejection fails, both on a factual basis and on a legal basis to state a *prima facie* case of obviousness. None of the legally required elements of a prima facie case of obviousness is present or has been shown in this case. Applicant respectfully traverses this rejection, and request the Examiner to reconsider and withdraw the rejection.

Hattori et al. teaches the use of polysilicon in "cutting regions" as gettering structures. Hattori et al. fails to disclose or suggest that the polysilicon should be doped and fails to disclose or suggest that doped polysilicon would perform any better as a gettering structure. At no time does Hattori et al. disclose or suggest that the polysilicon be doped for any reason. As noted in the previous Reply, polysilicon is disclosed by Hattori et al. as the gettering material for all of its disclosed embodiments. There is neither disclosure nor suggestion by Hattori et al. that the polysilicon could or should be doped. Hattori et al. therefore fails to provide any motivation whatsoever for modifying its specific teachings from the use of polysilicon to the use of any other material.

Mo et al. disclose nothing more than highly conventional doping of semiconductor substrates to form active components such as source and drain and the body of the semiconductor being oppositely doped, all of which is entirely conventional. Mo et al. fail to disclose or suggest doping a polysilicon gettering plug for any purpose and certainly not in order to enhance the gettering capability or capacity of the gettering plug.

The Examiner cited col. 6, lines 39-51 and Fig. 1A of Mo et al. as alleged support for the assertion that Mo et al. disclose "doped fill material containing a plurality of gettering sites....". This is clearly erroneous and is a factually incorrect statement of the disclosure of Mo et al. The Examiner's asserted reading of this disclosure of Mo et al. is misleadingly selective and takes words out of context in an attempt to support the incorrect assertions with respect to this reference. In addition, the cited portion of Mo et al. refers to Fig. 4e, not to Fig. 1A. The entire cited portion of Mo et al. is reproduced below.

> Next, as shown in FIG. 4e, polysilicon is deposited to fill the trench and cover the surface of the substrate, generally to a thickness of from about 1 to 2 μm depending on the trench width (shown by the dotted lines in FIG. 4e). This layer is then planarized by the nature of its thickness relative to the trench width, typically from about 2 to 5 kÅ (indicated by solid lines in FIG. 4e). The polysilicon is then doped to n-type, e.g., by conventional $POCl_3$ doping or by phosphorus implant.
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> The backside of the wafer need not be stripped (as is conventionally done prior to doping the polysilicon to enhance defect gettering) because any further doping of the highly doped substrate would be unlikely to result in any enhancement in defect gettering.

The latter sentence is separated here, in order to emphasize that it is distinct from the preceding sentences and that the disclosed doping has nothing to do with gettering. The mention of gettering in this latter sentence is the only mention of gettering at any time in the entire disclosure of Mo et al. The latter sentence relates only to backside gettering. The latter sentence says nothing about doping adding dopants to a polysilicon gettering plug. The latter sentence says that the backside of the wafer is conventionally stripped prior to doping to form semiconductor elements (i.e., source, drain), and refers only to a highly doped substrate, not to a gettering plug.

Neither the above-quoted disclosure, nor any other disclosure in Mo et al., says anything about doping a polysilicon gettering plug, nor does it say anything that would lead a person of ordinary skill in the art to use doped polysilicon for a gettering plug.

Any assertion that Mo et al. teaches "doped fill material containing a plurality of gettering sites..." as alleged by the Examiner is clearly in error and cannot provide the required factual basis for a *prima facie* obviousness rejection, because the reference simply does not disclose this. Thus, there is nothing in either of Hattori et al. or Mo et al. which would have rendered obvious Applicant's invention, as claimed in independent claims 1, 9 and 21, and therefore any of the claims dependent upon these independent claims. Accordingly, Applicant respectfully requests the Examiner to withdraw the rejections of all of Applicant's presently pending claims, and to indicate the allowability thereof.

The Examiner referred to Tseng for showing doped polysilicon deposited by ALPCVD. However, Tseng fails to disclose or suggest that this doped polysilicon could be used for gettering. Tseng never mentions the word "getter" in any form. The trench filled by Tseng is not a gettering trench, it is a bitline or wordline connection to the source/drain of a FET. Thus, there is no motivation in Tseng to apply the ALPCVD to deposit doped polysilicon to form a gettering structure, even in combination with Mo et al. and Hattori et al. since neither of these references disclose or suggest the use of doped polysilicon by any method for use as a gettering structure.

Thus, the cited references fail to disclose or suggest all the limitations of Applicant's claimed invention. Hattori et al. fails to disclose or suggest, and fails to provide any motivation whatsoever for, substitution of doped polysilicon for the gettering material. The disclosure of Mo et al. fails to provide any suggestion that a doped material could be placed in a plug or trench as in Hattori et al. The disclosure of Tseng fails to remedy the shortcomings of Hattori et al. and Mo et al.

Since the references fail to disclose all the limitations of the claimed invention, there can be no possible obviousness.

Since the references fail to disclose all the limitations of the claimed invention, there can be no motivation to make the claimed invention, and no possible obviousness.

Since the references fail to disclose all the limitations of the claimed invention and fail to provide any motivation, there can be no possible reasonable likelihood of success in making the alleged combination, and no possible obviousness.

Thus, the Office Action has stated none of the legally required elements of a case of *prima facie* obviousness. The rejection therefore cannot stand and must be withdrawn.

For the foregoing reason alone, the combination of Hattori et al., Mo et al. and Tseng fails to disclose all the limitations of Applicant's claimed invention, as described in claims 1, 9 and 21. Therefore, the rejection should be withdrawn for this reason alone. Applicant respectfully requests the withdrawal of all rejections based on Hattori et al., Mo et al. and Tseng.

In addition, the dependent claims include additional features which, when taken together with the foregoing claims, further define Applicant's invention over the disclosures of Hattori et al., Mo et al., and Tseng, either alone or in combination.

Applicant respectfully submits that for at least the foregoing reasons, Hattori et al. in combination with Mo et al. and Tseng fails to disclose or suggest Applicant's presently claimed invention, and that the Examiner has failed to state a factually correct or legally proper case of *prima facie* obviousness. Accordingly, Applicant respectfully requests the Examiner to reconsider and withdraw the rejection of Applicant's claims over the prior art, and to indicate that the claims are allowable. Applicant respectfully requests notice to such effect.

Applicant respectfully submits that all of the presently pending claims 1-15 and 21-25 are allowable over the art of record for the foregoing reasons.

CONCLUSION

For the foregoing reasons, Applicant respectfully requests the Examiner to reconsider and withdraw the rejections of Applicant's claims, and to allow the presently pending claims. Notice of Allowance is respectfully requested.

In the event issues remain in the prosecution of this application, Applicants request that the Examiner telephone the undersigned attorney to expedite allowance of the application. Should a Petition for Extension of Time be necessary for the present Reply to the outstanding

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Office action to be timely filed (or if such a petition has been made and an additional extension is necessary) petition therefor is hereby made and, if any additional fees are required for the filing of this paper, the Commissioner is authorized to charge those fees to Deposit Account #18-0988, Docket No. F0556.

Respectfully submitted,

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